



# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

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January 12, 2000

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

THRU: Sharon Falvey, Team Lead

FROM: Robert Davidson, Soils Reclamation Specialist

RE: Soils Technical Analysis of the Wild Horse Ridge Significant Revision, Co-Op Mining Company, Bear Canyon Mine, ACT/015/025-SR98(1)-2.

## **SUMMARY:**

The most recent significant revision submission was received on September 28, 1999. This is the first round of Technical Analysis for soils after making the determination that the significant revision package was administratively complete. The chronology for the Wild Horse Ridge Significant Revision (SR) is as follows:

Action	Date
Original SR submittal	12/28/1998
Administratively incomplete, SR returned	2/19/1999
Re-submittal	9/27/1999
Administratively Complete	11/3/1999

**TECHNICAL ANALYSIS:**

**ENVIRONMENTAL RESOURCE INFORMATION**

**SOILS RESOURCE INFORMATION**

Regulatory Reference: 30 CFR Sec. 783.21, 817.200(c); R645-301-220, -301-411.

**Analysis:**

Chapter 8, Soil Resources, Sections 8.1 through 8.7, discusses the soil resources within the proposed Wild Horse Ridge project for the Bear Canyon Mine. Relevant soils information includes prime farmland investigation, current and past soil surveys, soil characterizations, and substitute topsoil identification. The Analysis section discusses resource information as follows:

- Prime Farmland Investigation
- Soil Survey Information
- Soil Characterization
- Substitute Topsoil

**Prime Farmland Investigation**

A Prime Farmland site investigation was performed by the Natural Resources Conservation Service (NRCS). A negative determination was made for Prime Farmland or farmland of statewide importance within the proposed Wild Horse Ridge area (sections 24 and 25 T.16S. R. 7E. and sections 19 and 30 T.16S. R. 8E). The determination letter from the NRCS is dated July 9, 1999, and is included in Appendix 8-C.

**Soil Survey Information**

Chapter 8 supplies soil resource information for the proposed Wild Horse Ridge area by referencing two different soil surveys in Appendices 8-B and 8-F, respectively, as follows:

*Appendix 8-B, 1998 Order II Soil Survey, USDA, NRCS*

The current submittal states that Appendix 8-B contains a 1998 soil survey which was conducted for the proposed Wild Horse Ridge disturbance by the USDA NRCS. *The 1998 soil survey and associated soil analysis data could not be located either within the current submittal or in the approved MRP, Appendix 8-B. Section 8.1 states that Plate 8-1 is based on the 1998*

*survey. A copy of the 1998 soil survey and data need to be included in Appendix 8-B.*

- Appendix 8-F  
*1999 Order I Soil Survey, Environmental Industrial Services*

*Sections 8.1, 8.2, 8.7, and 8.7.1 do not reference or discuss the 1999 Order I soil survey. Since these sections refer to past soil surveys, discussion of the 1999 soil survey needs to be added for clarification. Further clarification needs to be given to identify which soil survey is being referenced and discussed in each of the sections.*

In May 1999, a site specific Order 1 soil survey for the proposed Wild Horse Ridge project area was performed and prepared by Mr. Daniel Larsen, Soil Scientist, Environmental Industrial Services (Appendix 8-F). The detailed survey contains soil descriptions, soil pedon descriptions, soil salvage suitability analysis, laboratory soil testing data, field soil profile descriptions, soil and landscape photographs, soils map, soil data collection map and salvageable soils map. The Wild Horse Ridge site contains seven soil mapping units as follows:

- A Pathead-Cabba Complex, 30 to 70 % slopes
- B Winetti, High Elevation, 5 to 30 % slopes
- C Winetti, High Elevation-Rock Outcrop, 10 to 30 % slopes
- D Doney, Deep, 10 to 30 % slopes
- E Datino-Guben Complex, 30 to 80 % slopes
- F Guben-Pathead Complex, 30 to 80 % slopes
- G Doney-Cabba-Podo Complex, 30 to 80 % slopes

All mapping and soil survey work were performed according to the standards of the National Cooperative Soil Survey. Based on the site-specific soil descriptions, and laboratory data, each of the soils was classified according to current NRCS soil taxonomy, and correlated with NRCS's Order II soil survey. Documentation of field data is presented in Map B-Soil Data Collection Map; Appendix C-Field Soil Profile Descriptions and Transect Data; and Appendix D-Soil Profile and Landscape Photographs. Appendix F contains information comparing soil mapping units between the 1999 Order I soil survey to NRCS's Order II soil survey. Adjustment summarizations were given for each specific change in identifying and renaming soils within the Wild Horse Ridge area.

*Chapter 8 does not reference Plate 8-1A, which is a continuation of the soils map showing the Wild Horse Ridge area. The soil maps (Plate 8-1 and Plate 8-1A) are scaled at 1-inch equals 200-feet, with 5-foot contour intervals. A total of 10 different soil mapping units are identified. Plate 8-1 shows three soil mapping units as DZE, PDR, and TR, with "D" identified as disturbed area soils. These three mapping units are for the existing Bear Canyon Mine disturbance area. Plate 8-1A identifies the 7 soil mapping units as contained in the 1999 Order I*

soil survey as PC, WIN, WR, DON, DG, GP, and DCP. These seven soil units are identified in the proposed disturbance area for Wild Horse Ridge.

### Soil Characterization

Soil pedons were characterized by the soil horizons at each sampling location. All profile descriptions were recorded on standard NRCS forms and are provided in Appendix C within Appendix 8-F. Field parameters for each soil pedon description includes horizon information, soil color, texture, rock fragment, soil structure, roots, clay films, and effervescence with 0.1N hydrochloric acid. In addition, general site descriptions include vegetation, climate regimes, land form physiography, relief, elevation, slope, aspect, erosion condition, permeability, drainage class, depth to saturation (ground water) if encountered, salts or alkali if present, and surface rock. Generalized soil properties are summarized as follows for each soil type:

Map Unit	Soil Map Symbol	Land Form	% Slope	Parent Material	Soil Depth	Texture	Rock Fragment Class	General Vegetation
A	PC	foothills	30-70	colluvium and shale	shallow to deep	sl, l, cl	stony to very cobbly	Pinion-Juniper
B	WIN	narrow canyon bottoms	5-30	alluvium and colluvium	deep	sl, l, ls	gravelly to bouldery	Cottonwood Douglas-fir Dogwood Wildrose
C	WR	narrow canyon bottoms	5-30	alluvium, colluvium and sandstone	shallow to deep	sl, l, ls	gravelly to bouldery	Cottonwood Douglas-fir Dogwood Wildrose
D	DON	toe slope, slight bench	10-30	colluvium, slope wash	deep	sl, l, ls	non-stony to stony	Ponderosa Pine Juniper Douglas-fir
E	DG	steep canyon slope, north aspect	30-80	colluvium and shale	moderate deep to deep	sl, l, cl	very stony to non-stony	Douglas-fir Pinion Mt. Mahogany Serviceberry
F	GP	canyon side slope	30-80	colluvium, sandstone and shale	shallow to moderate deep	sl, l, cl	very stony to bouldery	Douglas-fir Pinion Mt. Mahogany
G	DCP	steep canyon slope, south aspect	30-80	sandstone, shale and colluvium	shallow to moderate deep	sl, l, cl	very stony to non-stony	Pinion-Juniper Grass

Seven soil samples were selected from representative soil layers during soil inventory and were characterized according to the State of Utah Division of Oil, Gas and Mining (DOGM) guidelines for topsoil and overburden<sup>1</sup>. Sampled parameters include: pH; electrical conductivity; saturation percent; SAR includes Ca, Mg, and Na; texture includes % very fine sand, sand, silt and clay; TOC includes organic matter percent; CaCO<sub>3</sub>; Boron (CaCl<sub>2</sub> extraction); Selenium (AB-DPTA extraction); AWC includes 1/3 and 15 bar analyses; and ESP.

Soil samples were sent to Inter-Mountain Laboratories, Inc. for analysis. Appendix B contains the laboratory data sheets for all analysis on the 7 samples. A summary of soil laboratory results are noted below, excluding sample CW10-1 which is discussed below:

Parameter	Results (Range)	DOGM Rating *
pH	7.4 - 7.8	Good
EC (mmhos/cm)	0.33 - 0.64	Good to Poor
Saturation %	30 - 48	Good
SAR	0.3 - 0.7	Good
Texture	SIL, SL, L	Good
Boron (mg/Kg)	0.5 - 1.6	Good
Selenium (mg/Kg)	<0.02	Good
Avail Water Cap. (in/in)	0.06 - 0.14	Fair to Good

\* State of Utah Division of Oil, Gas and Mining (DOGM) guidelines for topsoil and overburden.

For all soils, except CW10-1, soil tests indicate that the soils generally rate fair to good for reclamation use. The one exception is soil sample CW10-1, which was taken from a light colored soil layer at about 20 to 30 inches in depth on a road cut in Soil Map Unit F. The sample was taken to document properties of a calcic horizon in a Guben soil. Soil test results indicate an unacceptable level of selenium (0.26 mg/Kg) and a poor rating for electrical conductivity (10.2 mmhos/cm). The sample was also higher in boron (2.5 mg/Kg), calcium (7.5 meq/L), magnesium (160 meq/L), sodium (35 meq/L), SAR (3.7) and pH (8.3) than the other soil samples. The CW10-1 sample site is at the edge of the existing road accessing the future portal

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<sup>1</sup>Leatherwood, J., and Duce, D., 1988. Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining. State of Utah Department of Natural Resources, Division of Oil, Gas and Mining.

site. The soil survey states that Co-Op Mining does not anticipate that this soil would be involved in site disturbance for portal development and that further assessment may be required if disturbance along this section of road is proposed. Every effort should be made to minimize disturbing and/or mixing the deeper subsoils (20 to 30 inches) of this section of road cut.

The **percent rock content** within the mine site disturbance or proposed facilities area is the main deterrent for soil suitability based on the current DOGM guidelines. Although DOGM suitability criteria considers >30% (by volume) rock fragments (for both gravels <3" in size and cobbles 3 to 10" in size) to be unacceptable, and >10% stones and boulders >10" in size to also be unacceptable, the recent trend by DOGM is to salvage **native soils** with **intrinsic or indigenous rock content**. Using indigenous rocky soils should enhance reclamation success by providing an environment similar to native conditions. However, higher rock content greater than is present in the surface soils needs to be avoided. Natural, intrinsic rock content provides for a more stable reclaimed surface, aids in water harvesting and water holding capacity of interstitial soils, and creates wildlife habitat and niches on the surface where surface boulders and larger cobble sized rocks are placed.

### **Substitute Topsoil**

The PAP does not propose any borrow as a source for substitute topsoil.

### **Findings:**

Information provided in the application is not considered adequate to meet the requirements of this section of the regulations. The applicant must provide the following in accordance with:

**R645-301-120, R645-301-222 and R645-301-223**, The following corrections need to be performed for Chapter 8 of the significant revision:

- Include the 1998 soil survey and associated soil analysis data in Appendix 8-B.
- Discuss and reference Appendix 8-F, 1999 Order I soil survey, in Chapter 8, Sections 8.1, 8.2, 8.7, and 8.7.1.
- Clarify discussions concerning each of the soil surveys (1980, 1990, 1996?, 1998, and 1999) as referenced in Chapter 8 to distinguish which soil survey is being referenced for what part of the Bear Canyon Mine.
- Reference Plate 8-1A in Chapter 8.

## **OPERATION PLAN**

### **TOPSOIL AND SUBSOIL**

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

#### **Analysis:**

Chapter 8, Soil Resources, Section 8.8, Removal, Storage and Protection of Soils, and Section 8.9, Selected Overburden Materials or Substitutes, discusses the soil's operation plan for the proposed Wild Horse Ridge area. For topsoil protection, Co-Op is using traditional methods of salvaging and stockpiling. The Analysis section discusses operation information as follows:

- Topsoil and Subsoil Removal
- Topsoil Substitutes and Supplements
- Topsoil Storage

#### **Topsoil and Subsoil Removal**

##### *Topsoil Salvage Volumes*

Based on DOGM guidelines and the Order 1 soil survey, Appendix 8-F identifies the approximate range and average soil salvage depth for each soil map unit. Potential salvage depths were generated for each map unit based on evaluations of all field and laboratory data, plant rooting depth and soil rock content. Topsoil salvage areas are broken down by soil survey map units and are identified on the Soil Suitability Map C, Appendix 8-F, Order 1 Soil Survey. The following table for salvage areas lists the depth of salvage along with root and subsurface rock information:

Map Unit	Salvage Layer (inches)		Fine Roots Rooting Depth (inches)	Subsurface Rock Within Soil Salvage Layer (percent)
	Approximate Range	Average Depth		
PC	8 - 15	12	15	<5 to 45
WIN	10 -30	15	no pit	no pit information
WR	0 - 20	10	24	50 to 60
DON	30 -60	40	60	7 to 15
DG	20 - 40	30	20	45
GP	0 - 30	10	36	60
DCP	6 - 30	15	34	12 to 40

Based on the Order I soil survey in Appendix 8-F and the projected average soil salvage depth, Co-Op Mining identified an approximate 8,493 cubic yards of soil available for salvage. The new Wild Horse Ridge will add 6.89 acres of disturbance; however, the Wild Horse Ridge access road is already disturbed and will remain after reclamation (~ 2.07 acres). Therefore, soil salvage will occur from the remaining 4.83 acres for an average soil salvage depth of 13 inches. However, the Wild Horse Ridge Access road will require some upgrading and widening for mining use, so topsoil will be recovered from isolated areas of new disturbance.

*The volumes of proposed topsoil salvage do not agree between Table 8.9-3 and Table 3O-1. Table 8.9-3 lists 8,493 CY while Table 3O-1 shows 6,161 CY of soil. Table 3O-1, Cut and Fill Volumes, is located in Appendix 3-O, Blind Canyon Seam Pad and Conveyor Access Roads. The Division is unable to verify soil salvage volumes because the plan does not list proposed disturbance acreage within each soil mapping unit.*



Topsoil Areas and Available Salvage Volumes			
Soil Map Unit	Average Salvage (inches)	Disturbance Acres	Volume (yd <sup>3</sup> )
PC	12	?	?
WIN	15	?	?
WR	10	?	?
DON	40	?	?
DG	30	?	?
GP	10	?	?
DCP	15	?	?
Total		?	?

The actual soil salvage depth and resulting volumes may vary according to actual conditions as they are encountered in the field during construction. State regulation R645-301-232.100 is specific in requiring that all topsoil be removed from the area to be disturbed. The plan states that adequate supervisory personnel will be present during topsoil salvage to instruct equipment operators in the proper techniques of salvage and to ensure that required horizons are removed. *However, a non-biased, soils specialist should supervise and document the topsoil salvage operations to ensure optimum topsoil salvage. In addition, the applicant needs to document topsoil history, soil salvage areas, soil salvage volumes, and soil placement in the stockpile.*

#### *Subsoil Segregation and Soil Salvage Practices*

In several of the soil mapping units the topsoil is less than six inches. State regulations state that if topsoil is less than six inches, the operator may remove the topsoil and the unconsolidated materials immediately below the topsoil and treat the mixture as topsoil. Therefore, the Order I soil survey, Appendix 8-F, shows that topsoil salvage will include the topsoil and the underlying horizon material immediately below the topsoil. Salvage of suitable subsoils with the topsoil is based on rooting depth and soil suitability criteria established in the Order 1 soil survey. Soil type, depth and rock content strongly influence re-vegetation, plant diversity, and erosion control.

### *Adverse Conditions*

Section 8.9.6, Wild Horse Ridge Disturbance, states that topsoil salvage will vary where bouldery material precludes complete salvage of the specified depths. *If bouldery surface areas and otherwise steep areas are accessible to construction machinery, then soils in these same areas are expected to be salvaged. Either steep, rocky surface slopes are safe for constructing cut slopes and likewise soil salvage, or they're not safe for either activity. Likewise, if steep, rocky slopes and extremely bouldery surface materials render themselves suitable for construction and as construction fill using conventional construction equipment, then these same areas and indigenous materials can be rendered suitable for topsoil salvage.*

### *Rocks - Boulders and Large Stones*

Reference to Robert Davidson's discussion with Jim Nyenhuis (Nyenhuus 1997) concerning salvaging soils with higher rock content has been misrepresented in the Appendix 8-F, Section 2.5, Soil Suitability For Salvage. The general idea is to salvage otherwise suitable soil containing indigenous amounts of rock that are typical within the soil salvage area. The main idea is that native soils with a higher intrinsic rock content than Division guideline deems acceptable, offer a greater potential for reclamation success as follows:

- allow a greater potential for moisture infiltration into the interstitial soils
- provide for a more stable reclaimed surface
- provide additional surface cover in sparsely vegetated areas, thus helping protect against rain drop impact and resulting soil surface erosion
- create wildlife habitat niches
- create micro-climates for plant establishment and vegetation survival.

### **Topsoil Substitutes and Supplements**

The amendment does not propose the use of any substitute topsoil for the Wild Horse Ridge project area.

### *Coal Waste, Underground Development Waste and Refuse Piles*

*The amendment states that Co-Op does not have any permanent refuse piles. The amendment needs to address the handling of coal waste and underground development waste for the Wild Horse Ridge mining project. Discussion needs to focus on disposal and handling of waste face-up material and underground development waste produced during mine entry and development. Surface disposal of coal refuse and underground development waste will require a minimum of 48 inches of cover using the best available material according to the requirements of R645-301-533.252.*

### **Topsoil Storage**

The Section 8.9.6 states that the Wild Horse Ridge topsoil stockpile will be located in the lower section of the right fork of Bear Canyon in the area of soil map unit "DON" (Plate 8-1A). The topsoil stockpile is shown on Plate 2-4F in the lower convergence section between the primary No. 3 mine access road and the primary conveyor access road No. 1.

The application further states that the topsoil stockpile will be surrounded with a containment berm and protected as discussed in Section 8.8.1.3. Prior to stockpiling salvaged topsoil, permeable fabric strips will be placed over the original soil surface to preserve the location of the contact zone between the native topsoil and the stockpile.

*Additional information concerning compaction and topsoil pile size and dimension is needed as follows:*

- *During topsoil pile construction, soil compaction is induced from earth moving machinery and vehicle traffic. State how compaction will be alleviated.*
- *Provide engineered drawings of projected stockpile, showing size, exact placement, final configuration and cross sections.*

#### *Shower House Topsoil Stockpile*

Prior to construction on the shower house pad, topsoil was salvaged and stockpiled. The final topsoil stockpile consisted of 1200 cubic yards. The Wild Horse Ridge amendment states that Co-Op proposes to relocate this topsoil stockpile to the Wild Horse Ridge topsoil stockpile. Following relocation, As-builts will be submitted updating the MRP.

#### *Tank Seam Access Road Topsoil Stockpile*

Topsoil was salvaged and stockpiled from the Bear Canyon Mine Tank Seam access road during construction. Volume of topsoil contained in this stockpile is approximately 1000 cubic yards. During construction of the Wild Horse Ridge area, Co-Op proposes to relocate this topsoil stockpile from the upper storage pad to the Wild Horse Ridge topsoil stockpile. Following relocation, As-builts will be submitted updating the MRP.

### **Findings:**

Information provided in the application is not considered adequate to meet the requirements of this section of the regulations. The applicant must provide the following in accordance with:

**R645-301-120**, Please correct or add the following information:

- List proposed disturbance acreage within each soil mapping unit.
- Correct the volumes of proposed topsoil salvage so that Table 8.9-3 agrees with Table 3O-1. Table 3O-1, Cut and Fill Volumes, is located in Appendix 3-O, Blind Canyon Seam Pad and Conveyor Access Roads.

**R645-301-232.100 and R645-301-232.200**, A non-biased, soils specialist should supervise and document topsoil salvage operations to ensure optimum topsoil salvage. Document topsoil salvage history, soil salvage areas, soil salvage volumes, and soil placement in the stockpile.

**R645-301-232.700 and R645-301-232.710**, If bouldery surfaces and otherwise steep slopes are accessible to construction machinery, then soils in these same areas are expected to be salvaged. If these areas render themselves suitable for construction and use as construction fill using conventional construction equipment, then these same areas and indigenous materials can be rendered suitable for topsoil salvage.

**R645-301-553.250**, The amendment states that Co-Op does not have any permanent refuse piles. Address the handling of coal waste and underground development waste, including face-up material waste, for the Wild Horse Ridge mining project. Surface disposal of coal refuse and underground development waste will require a minimum of 48 inches of cover using the best available material.

**R645-301-521.160 and R645-301-521.165**, Provide engineered drawings of projected stockpile, showing size, final configuration and cross sections.

**R645-301-234.200 and R645-301-234.220**, During topsoil pile construction, soil compaction is induced from earth moving machinery and vehicle traffic. State how compaction will be alleviated.

## **RECLAMATION PLAN**

### **TOPSOIL AND SUBSOIL**

**Analysis:**

Chapter 8, Soil Resources, Section 8.10, Redistribution of Soils, and Section 8.11, Nutrients and Soil Amendments, discuss the soil's reclamation plan for the proposed Wild Horse Ridge area. The Analysis section discusses reclamation information as follows:

- Soil Redistribution
- Soil Nutrients and Amendments
- Soil Stabilization

**Soil Redistribution**

The MRP divides the mining area up into different reclamation areas. The Wild Horse Ridge area is divided up as follows:

*TS-12, Wild Horse Ridge Access Road*

This road already exists and will remain after mining. Some upgrading and widening of the road will be required, so some topsoil will be recovered from isolated areas of new disturbance. *The application states that additional plant growth material will not be required during reclamation. Topsoil will be needed for 0.91 acres that will be reclaimed from the 2.98 acres of disturbance.*

*TS-13, Conveyor Belt Access Road/ Topsoil Stockpile Area*

Following re-contouring of this area at the time of final reclamation, topsoil will be redistributed to obtain an approximate depth of 6 inches. *However, from calculations based on reclaimed disturbed acreage and salvaged topsoil volumes, the average topsoil replacement thickness for the Wild Horse Ridge disturbed area should be around 13 to 14 inches. Table 8.9-1 shows that only 1.24 acres will be reclaimed from the 1.47 acres of increased disturbance. The plan does not explain why the entire 1.47 acres of increased disturbance will not be reclaimed.*

*TS-14, Upper Conveyor belt/Access Road*

The plan amendment states that topsoil will be redistributed at an approximate 6 inch depth. *However, from calculations based on reclaimed disturbed acreage and salvaged topsoil volumes, the average topsoil replacement thickness for the Wild Horse Ridge disturbed area should be around 13 to 14 inches. Table 8.9-1 shows that only 0.68 acres will be reclaimed from the 0.92 acres of increased disturbance. The plan does not explain why the entire 0.92 acres of increased disturbance will not be reclaimed.*

*TS-15, WHR Blind Canyon Seam Portal*

Topsoil removed from this area will be redistributed at an approximate 6 inch depth. Table 8.9-1 shows that 1.52 acres will be reclaimed in this area. *Calculations based on reclaimed disturbed acreage and salvaged topsoil volumes, show that the average topsoil replacement thickness for the Wild Horse Ridge disturbed area should be around 13 to 14 inches.*

**Soil Nutrients and Amendments**

Section 8.11, Nutrients and Amendments, states that following final grading, each of the reclamation areas will be sampled (see Table 8.11-1 for Sample Density) and the collected soil samples analyzed. The plan states that additional samples will be taken in the event that the initial sample indicates unsuitable material. Composite samples will be taken from 0 to 2 feet and from 2 to 4 feet at each sample location. The section concludes that all necessary fertilization and chemical treatments will be applied according to the results of the soil sampling and analysis program approved by the Division. *Other than making the comment that the samples will be analyzed for micro nutrients, the section does not state what other analyses will be performed. The amendment must contain the following:*

- *All samples must be analyzed according to the Division Guidelines for Topsoil and Overburden.*
- *All sampling, testing and result interpretation must be done by a qualified soil scientist. The soil scientist must be qualified to sample, test and interpret data results. Prior to sampling and testing of the topsoil material, the soil scientist's qualifications must be reviewed by the Division.*

**Soil Stabilization**

Following backfilling and regrading, the regraded surface will be scarified by a ripper to a depth of 14 inches to help reduce surface compaction, provide a roughened surface to help topsoil adherence, and help promote root penetration. Steep slope areas will be roughened by ripping to create ledges, crevices, pockets, and screes (talus slopes at the base of cliffs) to allow better soil retention and vegetation establishment.

To minimize compaction of replaced topsoil, travel on reclaimed areas will not be allowed. Co-Op will guard against erosion by using mulch, tackifier, and erosion control matting. Topsoil will be redistributed in the fall of the year to help promote vegetation establishment. In all cases, a very rough seed bed will be prepared.

**Findings:**

Information provided in the application is not considered adequate to meet the requirements of this section of the regulations. The applicant must provide the following in accordance with:

**R645-301-242.110,** Correct the following:

- The application states that additional plant growth material will not be required during reclamation for TS-12, Wild Horse Ridge Access Road. Topsoil will be replaced for 0.91 acres that will be reclaimed from the 2.98 acres of disturbance.
- Correct the plan to show that average topsoil replacement thickness for the Wild Horse Ridge disturbed area should be around 13 to 14 inches.

**R645-301-541.200,** All disturbed land not required for monitoring, unless approved by the Division as suitable for the post-mining land use or environmental monitoring, will be reclaimed. The plan needs to address the following:

- Table 8.9-1 shows that only 1.24 acres will be reclaimed from the 1.47 acres of increased disturbance for area TS-13. The entire 1.47 acres of increased disturbance needs to be reclaimed.
- Table 8.9-1 shows that only 0.68 acres will be reclaimed from the 0.92 acres of increased disturbance for area TS-14. The entire 0.92 acres of increased disturbance needs to be reclaimed.

**R645-301-224,** All soil samples must be analyzed for parameters according to the Division Guidelines for Topsoil and Overburden.

**R645-301-130,** All sampling, testing and result interpretation must be done by a qualified soil scientist. The soil scientist must be qualified to sample, test and interpret data results. Prior to sampling and testing of the topsoil material, the soil scientist's qualifications must be reviewed by the Division.

**RECOMMENDATION:**

Prior to approval, the requirements of R645-301-120, -130, -222, -223, -224, -232.100, -232.200, -232.700, -232.710, -234.200, -234.220, -242.110, -521.160, -521.165 and -541.200 must be provided as outlined above.

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